

## **REMARKS**

### **I. INTRODUCTION**

Claims 4-6, 8-12, 15-16, and 30-32 are pending in the application. Claims 1-3, 7, 13, 14, and 17-29 were previously canceled without prejudice or disclaimer. In view of the following remarks, the Applicant respectfully submits that the application is in condition for allowance and request a notice stating the same. Reconsideration and withdrawal of the rejections are respectfully requested.

### **II. CLAIM REJECTIONS UNDER 35 U.S.C. § 103(a)**

On pages 3-6 of the Office Action, claims 4, 5, 8-12, 16, and 30-32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,868,436 to Ootsuji *et al.* (“Ootsuji”), in view of U.S. Patent No. 3,928,525 to Fuwa *et al.* (“Fuwa”), U.S. Patent No. 3,331,100 to Gould, and U.S. Patent No. 5,804,116 to Schmid *et al.* (“Schmid”). The rejection is respectfully traversed.

“Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined.” *Graham v. John Deere*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966). “Often, it will be necessary . . . to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill in the art, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate review, this analysis should be made explicit.” *KSR Int’l v. Teleflex, Inc.*, 127 S. Ct. 1727, 1740-41, 82 USPQ2d (BNA) 1385, 1396 (2007). “Rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *In re Kahn*, 441 F.3d 977, 988, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006).

In rejecting claim 30, the Office Action acknowledges that Ootsuji fails to teach or suggest at least the recited steps of:

***heating the mixture in the extruder with an external  
heating unit to a temperature above the crystallite melting point but***

below the crosslinking temperature;

*controlling the temperature of the mixture in the extruder with the external heating unit and an internal cooling unit;*

continuously feeding the mixture from the extruder to an extrusion die, wherein *a melting pressure before entry to the extrusion die is approximately 700-1500 bar.*

(emphasis added). In view of these clear deficiencies in Ootsuji, the Office Action cites Fuwa, Gould, and Schmid and concludes that it would have been obvious to one of ordinary skill in the art at the time of the claimed invention to have modified the method of Ootsuji. The Applicant respectfully disagrees and traverses the rejection for at least the following reason: Ootsuji, alone or in combination with Fuwa, Gould, and Schmid, cannot reasonably be considered to teach or suggest at least the recited melting pressure.

The Office's proposed analysis and interpretation of Ootsuji regarding the recited "melting pressure" is believed to be unreasonable and without merit on technical grounds. The Office Action appears to present several reasons why Ootsuji meets (or "would meet") the claimed melting pressure. *See* Office Action, pages 3-4. For example, the Office Action opines that Ootsuji suggests optimizing "the extrusion temperature" and that "[s]ince temperature and pressure in the extruder are inextricably linked, a change in temperature also yields a corresponding change in pressure." Office Action, page 4. Expanding on this assumption, the Office Action cites a specific instantaneous pressure value ("2000 [atms]") recited in Ootsuji in the context of an example ram extrusion process and attempts to analogize such process to speculative conditions which may or may not be present in a screw extruder. *See* Office Action, page 4.

Notwithstanding the fact that such reasoning is not believed to be factual evidence capable of supporting a prima facie case of obviousness, the analysis also appears to be inconsistent with some fundamental concepts of continuous polymer extrusion. First, the term "melting pressure" is a term of art in the field of polymer extrusion which one of ordinary skill would understand to mean the pressure at the tip of the extruder screw (i.e., at the outlet of the extruder and just prior to the extrusion die). Second, although the temperature of and pressure on a polymer mixture in an extruder have some relation, a change in temperature does not necessarily yield a "corresponding" change in pressure as suggested in the Office Action. The Office's blanket statement in this regard seems to imply (incorrectly) that the Ideal Gas Law is applicable to a polymeric material being

processed in an extruder. Clearly, this is not the case as one of ordinary skill in the art will recognize. For example, when heat is applied to a polymer, the higher temperature may mean lower viscosity, which in turn can reduce the work (i.e., pressure) needed to push the polymer through an extrusion die.

With these principles in mind, it is respectfully submitted that the Office's proposed "analogy" fails to show that Ootsuji's screw extruder would meet the claimed melting pressure of approximately 700-1500 bar. The processes of ram extrusion and screw extrusion are fundamentally different and process conditions in one type cannot be "analogized" to the other. A review of the Dutch patent (NL6703789 – also published as US3591674) cited in Ootsuji as an example supplying device, for example, reveals that the recited pressure of "2000 [atms]" occurs in a closed pressure chamber (autoclave), after which the thermoplastic mixture is pushed on through a heated extrusion die. *See, e.g.*, US 3591674 col. 4, ll. 48-70. That is, the instantaneous pressure generated in the autoclave is isolated from the extrusion die. There is no discussion of pressures related to the extrusion of the mixture post-compression. In contrast, the melting pressure in a screw extruder is a direct function of the downstream resistance, e.g., due to the extrusion die. Moreover, the pressures generated in a screw extruder do not necessarily "gradually increase from atmospheric pressure to the extrusion pressure" as assumed in the Office Action. Therefore, the instantaneous compression described in Ootsuji in the context of a ram extrusion device in no way translates to pressures that may exist within a screw extruder, particularly a melting pressure just prior to entry to the extrusion die. The Office's conclusion that "the pressure at some point prior to entering the die land (i.e., before entry to the extrusion die) of Ootsuji et al. would meet the claimed pressures as the pressure gradually increases from atmospheric pressure to the extrusion pressure" is not based on a rational underpinning sufficient to support the legal conclusion of obviousness.

In view of the foregoing, it is respectfully submitted that at least claim 30 is allowable over Ootsuji. None of Fuwa, Gould, or Schmid, alone or in combination, are believed to remedy the deficiencies of Ootsuji with respect to the recited melting pressure. Claims 4, 5, 8-12, 16, and 31-32 depend from claim 30 and are submitted as being allowable for at least the same reasons. Reconsideration and withdrawal of the rejection are respectfully requested.

On pages 6-7 of the Office Action, claims 6 and 15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the proposed combination of Ootsuji, Fuwa, Gould, and Schmid, as applied to claims 4, 5, 8-12, 16 and 30-32 above, further in view of U.S. Patent No. 3,095,608 to Munsell. The rejection is respectfully traversed. Claims 6 and 15 depend from claim 30 and are submitted as being allowable for at least the same reasons. Munsell is not believed to cure the above-noted deficiencies of Ootsuji. Reconsideration and withdrawal of the rejection are respectfully requested.

### **III. CONCLUSION**

All of the stated grounds of rejection are believed to have been properly traversed or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider all presently outstanding rejections and that they be withdrawn. Applicant believes that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is hereby invited to telephone the undersigned at the number provided.

Prompt and favorable consideration of this Amendment is respectfully requested.

Respectfully submitted,

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/Ryan M. Flandro/.

Ryan M. Flandro  
Registration No. 58,094  
VENABLE LLP  
P.O. Box 34385  
Washington, D.C. 20043-9998  
Telephone: (202) 344-4000  
Telefax: (202) 344-8300

RK/RMF  
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